

REMARKS

Claims 1-13 have been examined. Claims 5-10, 12, and 13 have been rejected under 35 U.S.C. § 112, second paragraph, claim 1 has been rejected under 35 U.S.C. § 102(b), and claims 2-4 and 11 have been rejected under 35 U.S.C. § 103(a). Applicants submit that the claims are patentable.

I. Preliminary matters

A. Objection to the specification

The Examiner has objected to the specification because it contains minor informalities. Applicants submit that the amendments to the specification overcome the objection.

B. Objection to the drawings

1. Cleaning member

The Examiner has objected to the drawings because they do not show a cleaning member. Applicants respectfully submit that the cleaning member does not have to be shown in the drawings because it is not essential for a proper understanding of the invention. Specifically, the present invention is directed to a filter and related components for removing air bubbles, and the cleaning member is merely a general element of an ink jet apparatus which does not assist in the removal of air bubbles.

Nevertheless, Applicants submit that Fig. 1 does show the cleaning member. Furthermore, in order to better illustrate the cleaning member, Applicants are submitting herewith an enclosed proposed drawing correction that amends Fig. 1 to include reference designation that identifies the cleaning member.

2. Reference numeral 38

The Examiner has objected to the drawings because the reference character 38 is used to designate both the induction holes and the grooves. Applicants are submitting herewith proposed drawing corrections to Figs. 6 and 7(a) to overcome the objection.

3. Labeling Fig. 13 as “PRIOR ART”

The Examiner has objected to Fig. 13 because it should be labeled with the designation “PRIOR ART”. Applicants have labeled the figure as requested by the Examiner and submits that the objection is overcome.

C. Amendments to preambles

The preamble of claim 1 refers to an “ink-jet recording apparatus”, but claims 4-12 refer to an “ink-jet recording head”. Applicants have amended claims 4-12 so that their preambles correspond to the preamble of base claim 1. Furthermore, such amendments are not intended to change the scope of the claims.

II. Rejection under 35 U.S.C. § 112, second paragraph

Claims 5-12, 12 and 13 have been rejected under 35 U.S.C. 112, second paragraph.

Applicants submit that the rejection is overcome.

With respect to claim 5, the Examiner asserts that the phrase “said induction paths are formed at positions that are farthest from said ink supply path” is not supported in the specification. Applicants respectfully submit that the Examiner is incorrect. Specifically, page 9, lines 1-6, of the application clearly recites that the grooves 38 extend from the vicinity of the lower end of the insertion portion 36 to a position between the two ink supply paths 32. As clearly explained, this position is “farthest away from the ink supply paths 32.” This feature is clearly shown in Fig. 6 and Figs. 8(I)–8(III).

The Examiner also asserts that page 9, lines 19-22 does not support this feature. Again, Applicants respectfully submit that the Examiner is incorrect. This section of the specification clearly teaches that the ink “first wets one part of the area that is farthest away from the second ink supply paths 32 (Fig. 8(II)).” The illustrative, non-limiting embodiment show in Fig. 8(II) clearly depicts the ink wetting the portion of the filter 35 that is farthest away from the first ink supply paths (i.e. the portion in between the first ink supply paths 32).

With respect to claim 6, the Examiner asserts that the phrase “extended from an ink inlet for said second ink supply path to an area that does not face said first ink supply path” is unclear. Applicants respectfully submit that this feature is clearly shown in Fig. 6. As shown therein, the

ink induction path 38 extends from the ink induction hole 39¹ to a region that does not face the first ink supply paths 32.

With respect to the remaining grounds of the § 112 rejection, Applicants submit that they are overcome by the amendments to the claims.

III. Rejection under 35 U.S.C. § 102(b) over U.S.P. 4,368,478 to Koto (“Koto”)

Claim 1 has been rejected under 35 U.S.C. § 102(b) as being anticipated by Koto.

Applicant submits that the claim 1 is patentable over the cited reference.

For example, claim 1 relates to an ink-jet recording apparatus that comprises second ink supply path. Also, the second ink supply path comprises a connection portion and an enlarged portion, and a cross-sectional area of the enlarged portion is greater than a cross-sectional area of the connection portion. In addition, ink induction paths are formed in the enlarged portion. Since Koto does not disclose or suggest the features above, Applicants submits that claim 1 is patentable over the reference.

IV. Rejection under 35 U.S.C. § 103(a) over U.S.P. 5,821,965 to Oda et al. (“Oda”)

Claims 2-4 and 11 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Koto (as applied to claim 1) in view of Oda. Since claims 2-4 and 11 depend upon claim 1 and since Oda does not cure the deficient teachings of Koto with respect to claim 1, Applicants submit that claims 2-4 and 11 are patentable at least by virtue of their dependency.

¹ The specification and Fig. 6 have been amended herein to change the reference numeral for the ink induction hole from 38 to 39.

V. Newly added claims

Applicants have added new claims 14 and 15 to more fully define the present invention. Applicants submits that claim 15 is patentable over Koto and Oda because the references (alone or in combination) do not disclose or suggest the claimed ink induction paths that are extended from an ink inlet of the second ink supply path. Also, since claim 14 depends upon claim 1, Applicants submit that it is patentable at least by virtue of its dependency.

VI. Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

Applicants hereby petition for any extension of time which may be required to maintain the pendency of this case, and any required fee, except for the Issue Fee, for such extension is to be charged to Deposit Account No. 19-4880.

Respectfully submitted,



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APPENDIX

This Appendix illustrates the changes to the specification and claims.

IN THE SPECIFICATION:

Page 2, delete the second paragraph and insert:

Further, when a large air bubble [B] E enters the filter chamber D during the ink loading process, the air bubble F adversely affects the flow of ink, and the difference in the pressures between the upstream and the downstream sides of the filter E is increased.

Page 5, delete the fourth paragraph and insert:

A capping unit 6, which is provided in a non-printing area, seals the recording head 1 to prevent the nozzle openings from drying out, and negative pressure produced by a suction pump 7 is applied in order to remove clogging at the nozzle openings, or to load ink in a replacement ink cartridge 2. A cleaning member [7] 8 is also provided.

Page 8, delete the fourth full paragraph and insert:

The ink supply needle 30 is constituted by an insertion portion 36 that has a needle-shaped tip, and a funnel-shaped filter chamber 37 below that is opened up to cover the two second ink supply paths 32. As is shown in [Fig. 7] Figs. 7(a)-7(c), grooves 38 are formed in the

Page 9, continuation of fourth paragraph on page 8 insert:

internal face of the filter chamber 37 and are extended from the vicinity of the lower end of the insertion portion 36 to positions that are distant from the ink supply paths 32, preferably, in this embodiment, the middle portion of the area whereat the two ink supply paths 32 face each other, i.e., the positions that are farthest from the ink supply paths 32. Reference number 39 denotes an ink induction hole; and [39] 36, a fixed frame.

IN THE CLAIMS:

The claims are amended as follows:

1. (Amended) An ink-jet recording apparatus comprising:

a recording head for receiving ink supplied via a first ink supply path and for ejecting ink droplets;

a second ink supply path along which ink is transmitted from an ink [cartridge] supply to said first ink supply path,

wherein said ink is transmitted in said second ink supply path generally in an ink transfer direction from said ink supply to said first ink supply path,

wherein said second ink supply path comprises a connection portion that receives said ink from said ink supply and comprises an enlarged portion, and

wherein a cross-sectional area of said enlarged portion, which is substantially perpendicular to said ink transfer direction, is greater than a cross-sectional area of said connection portion, which is substantially perpendicular to said ink transfer direction; and

a filter which is located at a joint area that forms a communication portion situated between said first ink supply path and said second ink supply path, wherein said enlarged portion comprises at least a portion of said joint area,

wherein ink induction paths are formed [at said joint area on the side of said second ink supply path] in said enlarged portion in order to use capillary attraction to induce the flow of ink through said filter.

4. (Amended) An ink-jet recording [head] apparatus according to claim 1, wherein said ink induction paths are extended [from an ink inlet for said second ink supply path] to an area that does not face said first ink supply path.

5. (Amended) An ink-jet recording [head] apparatus according to claim 1, wherein said ink induction paths are formed at positions that are farthest from said first ink supply path.

6. (Amended) An ink-jet recording [head] apparatus according to claim 1, wherein said ink induction paths are formed as grooves.

7. (Amended) An ink-jet recording [head] apparatus according to claim 1, wherein said ink induction paths are formed as ribs.

8. (Amended) An ink-jet recording [head] apparatus according to claim 4, wherein said ink induction paths are integrally formed with said [joint area] enlarged portion.

9. (Amended) An ink-jet recording [head] apparatus according to claim 4, wherein said ink induction paths are formed by mounting a groove formation member in said [joint area] enlarged portion.
10. (Amended) An ink-jet recording [head] apparatus according to claim 4, wherein said ink induction paths are formed by mounting a rib formation member in said [joint area] enlarged portion.
11. (Amended) An ink-jet recording [head] apparatus according to claim 4, wherein said ink induction paths are formed so as to be coaxial with said second ink supply path.
12. (Amended) An ink-jet recording [head] apparatus according to claim 4, wherein said ink induction paths are formed in a holder that is [to be] mounted in said enlarged portion [joint area], [by using] said holder including a rod-shaped member that is positioned coaxially with said second ink supply path.
13. (Amended) An ink-jet recording [head] apparatus according to claim 4, wherein said ink induction paths include a layer having an affinity to ink [are formed of a layer that has a greater wettability to ink than has the other area].